REMARKS

Applicant respectfully requests reconsideration of this application. Claims 1 and 8 have been amended. No claims are cancelled. No new matter has been added.

Claims 1-3, 5, 7-10, 12, 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ostrom et al. (US 2002/0046354) in view of Issac et al. (US Patent No. 6,327,663).

Independent claim 1:

Amended independent claim 1 includes the elements of "a voltage controller having an output to prevent power droop caused by a change in computational state, before a change in computational state, and being coupled to receive a signal indicating a level of voltage, and a detector to anticipate power change, coupled to said voltage controller to provide said signal to anticipate a change in power level in said data processing system." (Emphasis added).

Ostrom discloses a power regulator and system configured to respond to transient load power demands (paragraph 0007). This system utilizes a circuit "to differentiate a rate of change of voltage supplied to load and provide a signal to the regulator in response to the rate of change of the voltage supplied to the load whose variations are typically caused by load induced transient events." (paragraph 0030) (Emphasis added). In essence, Ostrom teaches a system that adjusts voltage supplied to the load after a load change has taken place, but not a

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system that prevents power droop caused by a change in computational state by anticipating a power level change before a load is applied.

Isaac teaches a method and system for preventing electronic overstress during powering up a processor with voltage detection capability (Abstract). The OSPS is designed to prevent the power supplied to the processor from becoming too high and overloading the processor. Specifically, "The voltage supply adjustment mechanism employed by the system includes controlling voltage regulating circuitry to adjust the voltage supplied to the processor as to the appropriate power requirements during the powering up of the processor." (Col. 2, lines 57-62). Applicant's invention prevents power droop caused by a change in computational state and functions to provide a voltage boost before a change in computational state while Isaac aims "to reduce power supplied to the processor" (abstract) to prevent "electrical over stress and potential damage of the processor" (Col. 2 lines 65-66).

The Office Action states that the prior art "compensates for a loss" (Office Action page 8) as a result of a change in load. However, Applicant wishes to clarify that at least certain embodiments of the invention intend to increase power to the circuit before the load changes and does so by sensing the voltage and current to provide a voltage boost prior to an increase in power required by an application or load, thus preventing a power droop in the system when the application or load is executed. The application states that a change in power can be "detected by programming a processor to anticipate changes in compute load and as such, determine the power level needed to maintain the processor's

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frequency by instructing a voltage controller to increase voltage to compensate for any voltage droop that my occur at the processor. (Paragraph 0008) (Emphasis added). Therefore, the present invention intends to boost power supplied to the system after anticipating a change to the system.

Ostrom "responds" to a change in power caused by a load by adjusting the voltage supplied while Isaac teaches a system for "preventing electronic overstress" (abstract) during powering up a processor. Applicant teaches certain embodiments that <u>anticipate</u> a change in power caused by a load to provide a voltage boost, <u>before a change in computational state, to prevent a power droop</u>. As such, Applicant submits that the current invention is not obvious in view of combining Ostrom and Isaac and respectfully requests the withdrawal of the rejection to claim 1.

<u>Independent claim 8:</u>

Amended independent claim 8 includes the elements of "detecting a change in current, drawn by said data processing system directly, <u>or by sensing magnetic flux or magnetic flux changes indirectly</u>; determining according to the change in current a power level; and increasing a voltage level for a predetermined amount of time, <u>before a change in computational state,</u> to prevent voltage droop." (Emphasis added).

Ostrom and Isaac are described above. Applicant's invention teaches that a current detector may measure current indirectly by sensing "magnetic flux or magnetic flux changes" (Paragraph 0024). Neither Ostrom nor Isaac teaches or

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suggests this limitation. Furthermore, as describe above, a combination of Ostrom and Isaac fail to suggest a system that increases a voltage level in anticipation of a change in computational state to prevent voltage droop. Certain embodiments of the current invention teach the possibility of a microprocessor that can be programmed to "anticipate changes in current by examining instructions that are queued to be executed at the microprocessor and thus anticipate whether power demand is going to increase." (Paragraph 0032). As such, Applicant submits that the invention is not obvious in view of combining Ostrom and Isaac and respectfully requests the withdrawal of the rejection to claim 8.

Dependent claims 2, 3, 5, 9, 10, 12, 14, 15:

Dependent claims 2, 3, 5-9, 10, 12, 14 and 15 are dependent upon independent claims 1 and 8. At least for this reason, they are patentable over Ostrom in view of Issac.

Claims 4, 6, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ostrom et al. in view of Wright et al. (US Patent No. 5,774,736).

Claims 4 and 6 are dependent upon independent claim 1 and claim 13 is dependent upon independent claim 8. For at least this reason, claims 4, 6, 13 are patentable over Ostrom in view of Wright.

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Claims 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ostrom et al. and Isaac et al. as applied above, and further in view of Kanouda et al. (US Patent No. 6,580,597) and Maitra et al. (US Patent No. 5,623,647).

Independent claim 16:

Independent claim 16 includes the elements "programming a microprocessor in said data processing system with instructions to anticipate changes in compute load levels; determining according to said compute load level the power level needed at the microprocessor; increasing the voltage level for a predetermined amount of time to prevent power droop in response to said determining." (Emphasis added)

Ostrom and Isaac are described above. Kanouda discloses a voltage regulator module that includes a power supply circuit for supplying power to an integrated circuit. (Abstract). Nothing in any of the references nor their combination that suggests a system that anticipate changes in compute load levels and increasing the voltage level to prevent power droop.

Maitra discloses an apparatus for managing the operating speed of a microprocessor. The apparatus "prevents the microprocessor from operating at peak speeds when not required, thus reducing the power consumption and heat dissipation of the microprocessor." (Abstract). Maitra manages the operating speed of a microprocessor by "determining the application's computing

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requirement and adjusting the microprocessor's operation speed to meet the requirement." (Abstract). After the application is determined, the computing requirement of that process is determined, and the clock speed of the microprocessor is adjusted to meet the computing requirement. Maitra merely teaches the variation of microprocessor speeds according to the application requirements and an increase of power is not the intended result as the goal of the disclosure is to "reduce power and head dissipation of the microprocessor". Therefore, the current invention is not obvious in view of the disclosure by Maitra.

Dependent claims 17-21:

Dependent claims 17-21 are dependent upon Independent claim 16. For at least this reason, they are patentable over Ostrom and Isaac and further in view of Kanouda and Maitra.

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Conclusion

Applicant respectfully submits that the applicable rejections have been overcome by the remarks and that the claims are in condition for allowance. Accordingly, Applicant respectfully requests the rejections be withdrawn and the claims be allowed.

Invitation for a telephone interview

The Examiner is invited to contact the undersigned at (408) 720-8300 if there remains any issue with allowance or if the allowance of these claims could be facilitated by a telephone conference.
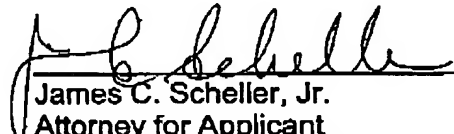
Additional Charges

Please charge any shortages to our Deposit Account No. 02-2666.

Respectfully submitted,

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